

## POLICY RESEARCH WORKING PAPER

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# Regional Integration as Diplomacy

*Maurice Schiff*  
*L. Alan Winters*

This paper explores a world in which regional trade agreements help reduce security tensions between neighbors.

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## Summary findings

Regional integration agreements (RIAs) are examples of second best and have an ambiguous impact on welfare, contend Schiff and Winters.

They build a model in which RIAs unambiguously raise welfare by correcting for externalities. It assumes that trade between neighboring countries increases trust between them and reduces the likelihood of conflict.

The optimum intervention in that case is a subsidy on imports from the neighbor. The authors show that an equivalent solution is for the neighboring countries to tax imports from the rest of the world — that is, to form an RIA — together with imposing some domestic taxes.

In fact, security threats have moved neighboring countries to form RIAs. Examples include the creation of the European Coal and Steel Community (1951) and the European Economic Community (1957) to reduce the threat of war in Europe, as well as various RIAs among developing countries.

Schiff and Winters show, among other things, that:

- The optimum tariffs on imports from the rest of the world are likely to decline over time.
- Deep integration implies lower optimum external tariffs if it is exogenous.
- But if deep integration is endogenous, it implies higher optimum external tariffs before it occurs and lower ones thereafter.
- Enlargement of a bloc (in terms of symmetric countries) has an ambiguous impact on external tariffs but improves welfare, and some form of domino effect exists in the sense that enlargement increases the incentive for nonmembers to seek accession.

Although externalities associated with security matters imply that an RIA may maximize welfare, this model suggests that the RIA is a transitory arrangement in the sense that optimum trade preferences are highest at the time the RIA is formed (when security is low) and tend to decline over time. In other words, the RIA's external trade policy becomes increasingly open over time (as well as following deep integration).

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This paper — a product of the Development Research Group — is part of a larger research program on regionalism and development (directed by the authors). Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Jennifer Ngaine, room N5-056, telephone 202-473-7947, fax 202-522-1159, Internet address [jngaine@worldbank.org](mailto:jngaine@worldbank.org). August 1997. (37 pages)

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# **Regional Integration as Diplomacy\***

**Maurice Schiff**

**and**

**L. Alan Winters**

**World Bank**

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## ABSTRACT

Regional integration agreements (RIAs) are examples of second best and have an ambiguous impact on welfare. This paper builds a model where RIAs unambiguously raise welfare by correcting for externalities. It assumes that trade between neighboring countries raises trust between them and reduce the likelihood of conflict. The optimum intervention in that case is a subsidy on imports from the neighbor. The paper shows that an equivalent solution is for the neighboring countries to tax imports from the rest of the world, i.e., to form a RIA, together with some domestic taxes.

In fact, security threats have moved neighboring countries to form RIAs. Examples include the creation of the European Coal and Steel Community (ECSC, 1951) and the European Economic Community (EEC, 1957) to reduce the threat of war in Europe, as well as various RIAs among developing countries.

The paper shows: i) that the optimum tariffs on imports from the rest of the world are likely to decline over time; ii) deep integration implies lower optimum external tariffs if deep integration is exogenous; iii) on the other hand, deep integration implies higher optimum external tariffs before deep integration and lower ones thereafter if deep integration is endogenous; iv) enlargement of bloc size (in terms of symmetric countries) has an ambiguous impact on external tariffs but raises welfare, and some form of domino effect exists in the sense that, starting from a two-member RIA, both the outside country and the RIA members want to enlarge the RIA.



## **Foreword**

As regional trading arrangements (RTAs) have spread, enlarged and deepened over the last decade, they have posed challenges to economists on both intellectual and policy levels. On the former, do RTAs stimulate growth and investment, facilitate technology transfer, shift comparative advantage towards high value-added activities, provide credibility to reform programs, or induce political stability and cooperation? Or do they, on the other hand, divert trade in inefficient directions and undermine the multilateral trading system?

The answer is probably “all of these things, in different proportions according to the particular circumstances of each RTA.” This then poses the policy challenge of how best to manage RTAs in order to get the best balance of benefits and costs. For example, should technical standards be harmonized and, if so, how; do direct or indirect taxes need to be equalized; how should RTAs manage their international trade policies in an outward-looking fashion?

Addressing these issues is one important focus of the research program of the International Trade Division of the World Bank. It has produced a number of methodological innovations in the traditional area of trade effects of RTAs and tackled four new areas of research: the dynamics of regionalism (e.g., convergence, growth, investment, industrial location and migration), deep integration (standards, tax harmonization), regionalism and the rest of the world (including its effects on the multilateral trading system), and certain political economy dimensions of regionalism (e.g., credibility and the use of RTAs as tools of diplomacy).

In addition to thematic work, the program includes a number of studies of specific regional arrangements, conducted in collaboration with the Regional Vice Presidencies of the Bank. Several EU-Mediterranean Association Agreements have been studied and a joint program with the staff of the Latin American and Caribbean Region entitled “**Making the Most of Mercosur**” is under way. Future work is planned on African and Asian regional integration schemes.

Regionalism and Development findings have been and will, in future, be released in a number of outlets. Recent World Bank Policy Research Working Papers concerning these issues include:

Glenn Harrison, Tom Rutherford and David Tarr, “Economic Implications for Turkey of a Customs Union with the European Union,” (WPS 1599, May 1996).

Maurice Schiff, “Small is Beautiful, Preferential Trade Agreements and the Impact of Country Size, Market Share, Efficiency and Trade Policy,” (WPS 1668, October 1996).

L. Alan Winters, “Regionalism versus Multilateralism,” (WPS 1687, November 1996).

Magnus Blomström and Ari Kokko, “How Foreign Investment Affects Host Countries” (WPS1745, March 1997)

Magnus Blomström and Ari Kokko, "Regional Integration and Foreign Direct Investment: A Conceptual Framework and Three Cases" (WPS1750, April 1997)

Eric Bond, "Using Tariff Indices to Evaluate Preferential Trading Arrangements: An Application to Chile" (WPS1751, April 1997)

Pier Carlo Padoan, "Technology Accumulation and Diffusion: Is There a Regional Dimension?" (WPS1781, June 1997)

Won Chang and L. Alan Winters, "Regional Integration and the Prices of Imports: An Empirical Investigation" (WPS1782, June 1997)

Glenn Harrison, Thomas Rutherford and David Tarr, "Trade Policy Options for Chile: A Quantitative Evaluation" (WPS1783, June 1997)

Anthony Venables and Diego Puga, "Trading Arrangements and Industrial Development" (forthcoming)

Planned future issues in this series include:

Sherry Stephenson, "Standards, Conformity Assessments and Developing Countries"

Valeria De Bonis, "Regional Integration and Factor Income Taxation" and "Regional Integration and Commodity Tax Harmonization"

Other papers on regionalism produced by IECIT include:

Ahmed Galal and Bernard Hoekman (eds), Regional Partners in Global Markets: Limits and Possibilities of the Euro-Med Initiative. CEPR 1997.

Bernard Hoekman and Simeon Djankov, "Imports of Inputs, Foreign Investment and Reorientation of East European Trade," World Bank Economic Review (forthcoming)

Bernard Hoekman and Simeon Djankov, "The EU's Mediterranean Free Trade Initiative," World Economy

Bernard Hoekman and Simeon Djankov, "Effective Protection in Jordan and Egypt in the Transition to Free Trade with Europe," World Development.

Bartłomiej Kaminski, "Establishing Economic Foundations for a Viable State of Bosnia and Hercegovina: Issues and Policies".



**In addition, Making the Most of Mercosur issued the following papers:**

**Alexander J. Yeats, "Does Mercosur's Trade Performance Raise Concerns About the Effects of Regional Trade Arrangements?" (WPS1729, February 1997))**

**Azita Amjadi and L. Alan Winters, "Transport Costs and 'Natural' Integration in Mercosur" (WPS1742, March 1997)**

**Claudio Frischtak, Danny M. Leipziger and John F. Normand, "Industrial Policy in Mercosur: Issues and Lessons"**

**Sam Laird (WTO), "Mercosur Trade Policy: Towards Greater Integration"**

**Margaret Miller and Jerry Caprio, "Empirical Evidence on the Role of Credit for SME Exports in Mercosur"**

**Malcom Rowat, "Competition Policy within Mercosur"**

**For copies of these papers or information about these programs contact Maurice Schiff, The World Bank, 1818 H Street NW, Washington, D.C. 20433.**

**An additional major outlet for World Bank-sponsored research on regionalism will be the Annual Bank Conference on Development in Latin America, 1997, Montevideo, June 30-July 2, 1997, organized by the Office of the Chief Economist and the Technical Department for Latin America and the Caribbean Region, with the support of the International Trade Division and the Economic Development Institute.**

**Masood Ahmed  
Director  
International Economics Department**



## Regional Integration as Diplomacy

*"Il n'y aura de paix en Europe si les Etats se reconstituent sur une base de souveraineté nationale avec ce que cela entraîne de prestige et de protection économique ... la constitution de vastes armées sera à nouveau nécessaire ... L'Europe se recréera une fois de plus dans la crainte ... à moins que les Etats d'Europe ne se forment en une Fédération ou une "entité européenne" qui en fasse une unité économique commune."*<sup>1</sup>

Jean Monnet, Algiers, 5 August 1943 (Note de réflexion).

### 1. Introduction

As has long been known, regional integration agreements (RIAs) are examples of second best, the impact of which on economic welfare is ambiguous. Despite an enormous theoretical, empirical and historical-descriptive literature, no consensus on the desirability of RIAs has emerged.<sup>2</sup>

Given the ambiguity of the static welfare impact of RIAs and also their generally small estimated size, many commentators have appealed to dynamic effects such as those on FDI, economies of scale, and convergence to justify them. Whether these dynamic effects actually take place as a result of RIAs, however, has not been conclusively demonstrated either analytically or

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<sup>1</sup>The idea that commercial ties will reduce the risk of European wars dates back at least to the 1795 publication of Kant's Perpetual Peace (Kant, 1992, p. 157).

<sup>2</sup>One of the few unambiguous static results which has emerged is that in the case of product homogeneity, a RIA between small countries whose terms of trade are given exogenously will result in a welfare loss for the RIA as a whole as long as its members continue to trade with the rest of the world after formation of the RIA (Panagariya, 1995; Schiff 1996a). And even this result need not hold if smuggling takes place between the member countries before the RIA is formed (Schiff, 1996a).

empirically. And even if they do occur, they need not result in welfare gains. For instance, increased FDI may result in immiserization if it leads to the expansion of protected sectors.

One case in which RIAs may in theory generate unambiguous welfare gains is if they correct externalities. For instance, it is frequently claimed that a developing country which is in the process of reforming its trade and other policies can benefit from a RIA with a large, developed country or region (e.g., the US or EU) because this binds its reforms in an international treaty, weakens the groups who stand to lose from and oppose the reforms, and raises credibility in their sustainability.<sup>3</sup> And even though the standard static welfare impact of such a RIA may be negative for the reforming country, the latter is likely to gain once the benefits of the enhanced credibility of the reforms are taken into account.

A second kind of externality arises if a RIA generates improved security for its member countries. There are basically three types of situations where RIAs may generate such positive externalities. First, there may be domestic security threats such as civil disruption or civil war. For instance, the Egyptian government has been concerned with the spread of fundamentalism and those of Morocco and Tunisia have been concerned with the possibility of contagion from fundamentalism in neighboring Algeria, with the associated risk of civil strife. These issues, which have also been of concern to the EU, have provided one of the motivations for agreements between these Mediterranean countries and the EU.

Second, countries may respond to third-country security threats by forming a regional arrangement. For instance, the Southern African Development Coordination Conference (SADCC), which eventually developed trading arrangements under the Southern African

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<sup>3</sup>See Fernandez (1997) for an insightful discussion of these arguments.

Development Community (SADC), was formed to provide a united front against South Africa. The Gulf Cooperation Council (GCC) was created in part in response to the potential threat of regional powers such as Iran and Iraq. And a major motive of Central and Eastern European countries for applying for membership to the EU is as protection against the perceived threat from Russia.

Third, security threats between neighboring countries may move them to form RIAs. Examples of this motivation are said to include the creation of the European Coal and Steel Community (ECSC, 1951) and the European Economic Community (EEC, 1957) to reduce the threat of war in Europe (see the quote of Jean Monnet at the start of the paper), ASEAN to reduce tensions between Indonesia and Malaysia, and MERCOSUR to reduce tensions between Argentina and Brazil (see Bastian, 1996). Page (1996) suggests that this element is also found in the formation of APEC and the CACM which include potential political/military opponents.

This paper explores this last case—the use of regional trade agreements as a route to rapprochement between antagonistic states. Our purpose is not to advance this argument, although we shall briefly consider the case that has been made for it, but rather to subject it to a measure of formal scrutiny. Thus we shall take at face value the claim that an RIA reduces the tension between potential enemies and ask what implications this has for the form and evolution of the agreement. Our purpose is twofold. First, if we accept the hypothesis—say, on the basis of statements by politicians—we would be able to make predictions about the development of regional integration and thus possibly to comment on issues such as whether or not it is a stepping stone towards multilateralism.

Second, and more interestingly, the implications we derive provide a set of testable predictions which would potentially allow us to test whether or not particular RIAs have stemmed

from this form of security motive. We say “potentially” because we recognize that in practice RIAs are likely to arise and evolve from a combination of forces which may offset the effects of the political motivation. Nonetheless, if our predictions are rejected we may at least refute the assertion that security was the only or even the main motivation behind an RIA.

The remainder of the paper is organized as follows. Section 2 explores the argument that integration fosters security and in Section 3 this is translated into a formal model. The solution is provided in Section 4 (under symmetry in Section 4.1 and under asymmetry in Section 4.2). The relationship between deep integration and optimum external trade policy is examined in Section 5. Exogenous deep integration is analyzed in Section 5.1 and endogenous deep integration in Section 5.2. Dynamic aspects are examined in Section 6. Bloc enlargement and domino effects are examined in Section 7. Section 8 concludes and Section 9 discusses possible extensions.

The model provided in this paper abstracts from defense as an alternative means of providing security. This issue is on our research agenda, however; see Section 9 for a discussion of this and other possible extensions.

## 2. Trade and Security<sup>4</sup>

The notion of trade as a civilizing influence is an old one—see Hirschman (1982). The notion that international trade is a means of diffusing tension and bringing nations together is also venerable. The nineteenth century British politician Richard Cobden persistently advocated that Britain should trade freely with her neighbors as a means of convincing them of the advantages of free trade and also as a means of locking them more fully into the community of nations. In the

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<sup>4</sup> We are grateful to Doug Irwin for suggestions on this section, but he should not be held responsible for its shortcomings.

twentieth century Cordell Hull, US Secretary of State (1933-44) and in some ways the architect of the post-war international trading order, advocated this view throughout his public life. His autobiography contains homely stories of trade reconciling warring neighbors along with discussions of international strategy—Hull (1948, e.g., p. 364 and p. 84, respectively).

While “trade as a reconciler” seems a necessary underpinning for “regionalism as security,” it is not really sufficient. Both Cobden and Hull also expressed a strong faith in non-discrimination. Thus, while the Cobden-Chevalier Treaty of 1860 between France and Britain was bilateral, Cobden’s conception was multilateral and the Treaty itself contained an unconditional MFN clause. Hull was explicit that trade discrimination bred tensions rather than diffused them (Hull, 1948, p. 81, p. 363).<sup>5</sup>

To obtain an advocacy for regionalism on security grounds one must turn to continental Europe. Wilfredo Pareto apparently argued in 1889 that “customs unions ...[were]... a means to better political relations and eventual pacification” (Machlup, 1977, p. 41) and Robert Schuman and Jean Monnet—the founding fathers of the EEC—were explicit that the ECSC was to make Franco-German war not only “unthinkable, but materially impossible” (see Swann, 1992, p. 6). Monnet also argued that while Britain, the United States and the USSR could withdraw into their own spheres, France and Germany were inextricably linked and had no alternative than to solve the “European problem.” Thus his more regional focus was, perhaps, understandable.

Later echoes of Monnet’s views are common. For example, Dr. Walter Hallstein, a former president of the EC Commission, put it clearly when he stated: “We are not in business at all; we

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<sup>5</sup>Hull advocated the principle of unconditional mfn, which in US usage implies offering mfn tariffs to any country offering mfn to the United States. That is, it continues to permit discrimination against those “outside the system.”

are in politics" (see Swann, 1992, p. ix) And Jones (1993), referring to France and Germany, states that "Some trading blocs may be advocated primarily to avoid military conflicts" (p. 83).<sup>6 7</sup> Hirschman (1981, Chapter 12) makes a similar point, though he argues that the EC may have arrived a bit late.

Security and other "non-economic" aspects of RIAs also seem to have played a role in the Southern Cone. Argentina and Brazil signed nuclear cooperation and economic agreements (e.g., in the area of capital goods and automobiles) in the mid-1980s, quite possibly hoping that the removal of external tensions would allow each to reduce the power of the military and strengthen its fragile democracy. The creation of Mercosur in 1991 continued this process and bound smaller neighboring countries into it. The political effectiveness of Mercosur is sometimes held to be proven by recent rumors that a possible coup in Paraguay was laid to rest following a pointed reaffirmation by the presidents of the four member countries - based on a clause in the Treaty of Asuncion establishing Mercosur - that democracy was a necessary condition for membership in the bloc (Survey on MERCOSUR, The Economist, October 12, 1996). While this appears persuasive evidence of the link between RIAs and politics, it is not beyond dispute that such concerted action depended wholly on the existence of Mercosur, or that expulsion from the RIA rather than some

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<sup>6</sup>Jones (1993) also argues that, since open markets imply a loss of national control over the economy, countries may prefer to form RIAs with 'like-minded' neighbors. In other words, the issue of cultural externalities may influence the decision on forming a RIA as well as the choice of partner. For instance, one reason that is sometimes advocated for why a number of North African countries have chosen to form RIAs with the EU rather than liberalize unilaterally is that the latter would subject them to open competition with Asia and possibly threaten their lifestyle. The analysis provided in this paper applies to cultural externalities as well.

<sup>7</sup>Note that Switzerland, which found an alternative way to generate security, namely through neutrality, has so far been reluctant to join the EU.



other sanction was the critical threat. Thus at least a measure of caution should be exercised in interpreting this experience.<sup>8</sup>

Srinivasan (1994) argues that integration might contribute to reducing tensions in South Asia. He states that "It is conceivable that promoting freer movement of goods, services, people and capital in the region might also facilitate the resolution of political and territorial disputes" (p. 7).

Political scientists have also discussed the use of trade diplomacy within a regional context, including whether and what type of RIAs might raise welfare of the member countries through "intra-mural conflict avoidance and management." Bastian (1996) argues that trade negotiations between leaders of neighboring countries are likely to result in a higher degree of trust between them. He mentions that RIAs may enable "...political and/or economic elites to form coalitions for subsequent collaboration and consensual action", and that they may "... carry their own language and discourse, thus being able to socialize the participants, e.g., when talking about a 'region'." Mansfield (1992) also recognizes the importance of security externalities in trade relations. However, he argues that countries will lower barriers with those who belong to the same alliance (e.g., NATO) because the increased trade will raise incomes which can then be used to raise defense expenditures; the latter is only beneficial if done between allies, not with adversaries. Contrary to Mansfield, we assume that the very action of trading generates security benefits, irrespective of any income effects. Moreover, Mansfield's analysis is weakened by the

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<sup>8</sup> Note also that the preservation of democracy in a member country is a somewhat different political payoff from the alleviation of inter-member conflict that we are primarily interested in, though democratic regimes may contribute to security by reducing inter-member conflict through increased trade (Polachek 1996).

assumption that lowering trade barriers towards allies generates income gains, since, in fact, the impact of trade preferences on income is ambiguous (second best).

Evidence on the impact of trade on the likelihood of conflict between any pair of countries is limited. A large number of studies in the political science literature have confirmed the results of Chan (1984) that conflict is less prevalent between any two countries if both are democratic. Polachek (1992, 1996) explains this finding through the effect of democracy on trade. He finds that democracies trade more with each other than other countries, and - using detailed data from the Conflict and Peace Data Bank - finds a significant and negative impact of trade on conflict. He obtains an elasticity of his measure of conflict with respect to trade of -0.15 to -0.19. One question is the direction of causality, i.e., whether conflict reduces trade or trade reduces conflict. Polachek tested this by means of three-stage least squares, and found that the trade variable remained statistically significant and became empirically more important (elasticity of -0.30) in the conflict equation while the conflict variable was not significant in the trade equation. The causality results were confirmed by Granger causality tests (Gasiorowski and Polachek 1982).

Before turning to the model, we should note that this paper refers largely, if not exclusively, to RIAs in a geographic sense, or to what Ethier (1996) has called "regional regionalism". This definition would seem to cover most RIAs since they are generally formed among neighboring countries. Examples include the EU, Mercosur, the Andean Pact, the CACM, NAFTA, ASEAN's AFTA, SAFTA, the GCC, ECOWAS and SADC. Our analysis is thus of potential relevance for the majority of RIAs.

### 3. The Model

Assume three countries (1, 2 and ROW) and three normal goods (A, B and R). Country 1 produces good A, Country 2 produces good B, and ROW (the rest of the world) produces goods A, B and R. The production, consumption and trade patterns are shown in Table 1.

We abstract from optimal taxation issues related to economic power on the world market in order to focus exclusively on matters of security and trade diplomacy.<sup>9</sup> Hence, we assume that Countries 1 and 2 are small and that the world prices  $P_A^*$ ,  $P_B^*$  and  $P_R^*$  (of goods A, B and R, respectively) they face are determined in ROW.

Table 1. Production, Trade and Consumption Pattern

|           | Production | Export | Import | Consumption |
|-----------|------------|--------|--------|-------------|
| Country 1 | A          | A      | B, R   | A, B, R     |
| Country 2 | B          | B      | A, R   | A, B, R     |
| ROW       | A, B, R    | R      | A, B   | A, B, R     |

Without loss of generality, units of A, B and R are selected such that  $P_A^* = P_B^* = P_R^* = 1$ . Denote consumer prices of goods A, B and R in Country  $i$  ( $i = 1, 2$ ) by  $P_A^i$ ,  $P_B^i$  and  $P_R^i$ , respectively. Assume a representative consumer  $I_i$  in Country  $i$ , whose consumption of goods A, B and R is denoted by  $A_i$ ,  $B_i$  and  $R_i$ , and with utility

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<sup>9</sup> See Krugman (1991) for an analysis of custom unions' optimal common external tariffs associated with market power.

$$(1) U_i = X(A_i, B_i, R_i) + Z_i(SK_i); i = 1, 2,$$

$$X_j, Z_i' > 0, X_{jj}, Z_i'' < 0, X_j(j=0) = \infty, X_j \equiv \partial X / \partial j \quad (j = A_i, B_i, R_i),$$

with  $U_i$  twice continuously differentiable. The assumption  $X_j(j=0) = \infty$  ( $j = A_i, B_i, R_i$ ) ensures internal equilibrium in the sense that Countries 1 and 2 trade both with each other and with the ROW no matter what taxes and/or subsidies are applied.

$SK_i$  denotes the level of security in Country  $i$  associated with trust in the neighboring country, or the level of 'security capital' in Country  $i$ . The assumption is that utility increases at a decreasing rate as the level of security increases. Security  $SK_i$  is a public good which  $I_i$  takes as given when maximizing  $U_i$ .

The welfare impact of incorporating a public good  $SK_i$  (social capital) in the utility function was examined in the case of labor mobility in Schiff (1992) and in the case of international migration in Schiff (1996b). Becker (1996) and Bliss (1994) also assume that social capital enters the utility function. Note that security capital  $SK_i$  could have been incorporated in the production functions for goods A and B rather than (or as well as) in the utility function. The reason for incorporating security in the production function is that a lower degree of security implies that more resources must be devoted to security matters and fewer are available for the production of goods A and B. This approach is taken in Schiff (1996c) which examines the impact of policy reform under ethnic diversity.

Assume Country  $i$ 's only endowment is labor  $L_i$  ( $i = 1, 2$ ). Total output A (B) in Country 1 (2), and which equals national income  $Y_1$  ( $Y_2$ ) measured at world prices, is

$$(2) Y_1 = A = aL_1, Y_2 = B = bL_2; \quad a, b > 0,$$

with per capita income  $y_1 = a$  and  $y_2 = b$ .

We refer below to Countries 1 and 2 as partners whether or not they are formally members of a RIA. Assume that an increase in home country imports from the partner raises the home country's knowledge of and trust in the partner and reduces the level of insecurity in the home country. In other words, importing from the partner country increases interaction with individuals in the partner country, raises the level of information about them, and increases the level of trust and security in the home country.<sup>10</sup> Equivalently, larger home country imports from the partner raises the importance of the home country as a market for partner exports and, given the increased cost of killing the goose that lays the golden egg, lowers the likelihood of a security threat by the partner country.

Assume that the level of security in the home country falls as the partner's relative income increases because it implies a greater relative power for the partner and thus a larger potential security threat for the home country. Assume also that the higher the partner's relative income, the greater the home country's security gains from additional imports from the partner. Thus,

$$(3) SK_1 = SK(B_1, Y_2/Y_1); \quad SK_2 = SK(A_2, Y_1/Y_2)^{11},$$

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<sup>9</sup> Note that in this setup, the level of home country imports of the partner's good equals the level of home country consumption of the partner's good (since it is not produced in the home country).

<sup>11</sup> In fact, SK depends on total (rather than on  $L_1$ 's per capita) imports from the partner, so that the term  $L_1$  should be included in the equation. Excluding it does not affect the model's solution (though it matters in the case of population changes, as noted below) and is done for notational simplicity.

with  $SK_i$  twice continuously differentiable,  $SK_1$  ( $SK_2$ ) increasing in  $B_1$  ( $A_2$ ) and decreasing in  $Y_2/Y_1$  ( $Y_1/Y_2$ ), strictly concave, and with  $\partial SK_1' / \partial (Y_2/Y_1) > 0$ ,  $\partial SK_2' / \partial (Y_1/Y_2) > 0$  (where  $SK_1'$  ( $SK_2'$ )  $\equiv \partial SK_1 / \partial B_1$  ( $\partial SK_2 / \partial A_2$ )). The latter implies that the security benefits from imports from the partner increase as the partner's relative income increases.

#### 4. Solution

Individuals  $I_i$  maximize  $U_i$  with respect to  $A_i$ ,  $B_i$  and  $R_i$ , subject to the budget constraint  $Y_i = P_A^i A_i + P_B^i B_i + P_R^i R_i$ , and taking  $SK_i$  as given exogenously ( $i = 1, 2$ ). The first-order conditions are

$$(4) X_A^i / X_R^i = P_A^i / P_R^i, X_B^i / X_R^i = P_B^i / P_R^i; X_j \equiv \partial X / \partial j \quad (i = 1, 2; j = A_i, B_i, R_i).$$

In the absence of domestic or trade taxes in Countries 1 and 2,  $P_j^i = P_j^* = 1$  ( $i = 1, 2; j = A_i, B_i, R_i$ ), and individual  $I_i$ 's utility maximization implies

$$(5) X_A^i / X_R^i = X_B^i / X_R^i = 1.$$

Even though Country 1 (2) is small, the absence of domestic or trade taxes does not maximize welfare because of the externalities associated with the impact of imports  $B_1$  ( $A_2$ ) from Country 2 (1) on  $SK_1$  ( $SK_2$ ). A policy of zero trade and domestic taxes maximizes national income  $L_i X_i$ , i.e., it maximizes the part of welfare  $W_i = L_i U_i$  which depends directly on the consumption

of goods and services. However, welfare depends on national income  $L_i X_i$  as well as on the benefits from security  $L_i Z_i$ . Individual utility maximization is based on the assumption that  $\partial X/\partial j = \partial U/\partial j$  for  $\forall j$ , while social welfare maximization recognizes that  $\partial X/\partial j < \partial U/\partial j$  for  $j = B_1, A_2$ , with the home country's social gain from imports from the partner larger than the private gain by the impact on security.

It is well known that welfare maximization requires distortions to be attacked at the source (Bhagwati 1987), and policy should result in the internalization of the externalities. In this case, since  $SK$  is a function of imports, welfare  $W_i = L_i U_i$  in the home country is maximized with a subsidy  $S_i$  on imports from the partner country (assumed to be financed through lump sum taxation) equal to

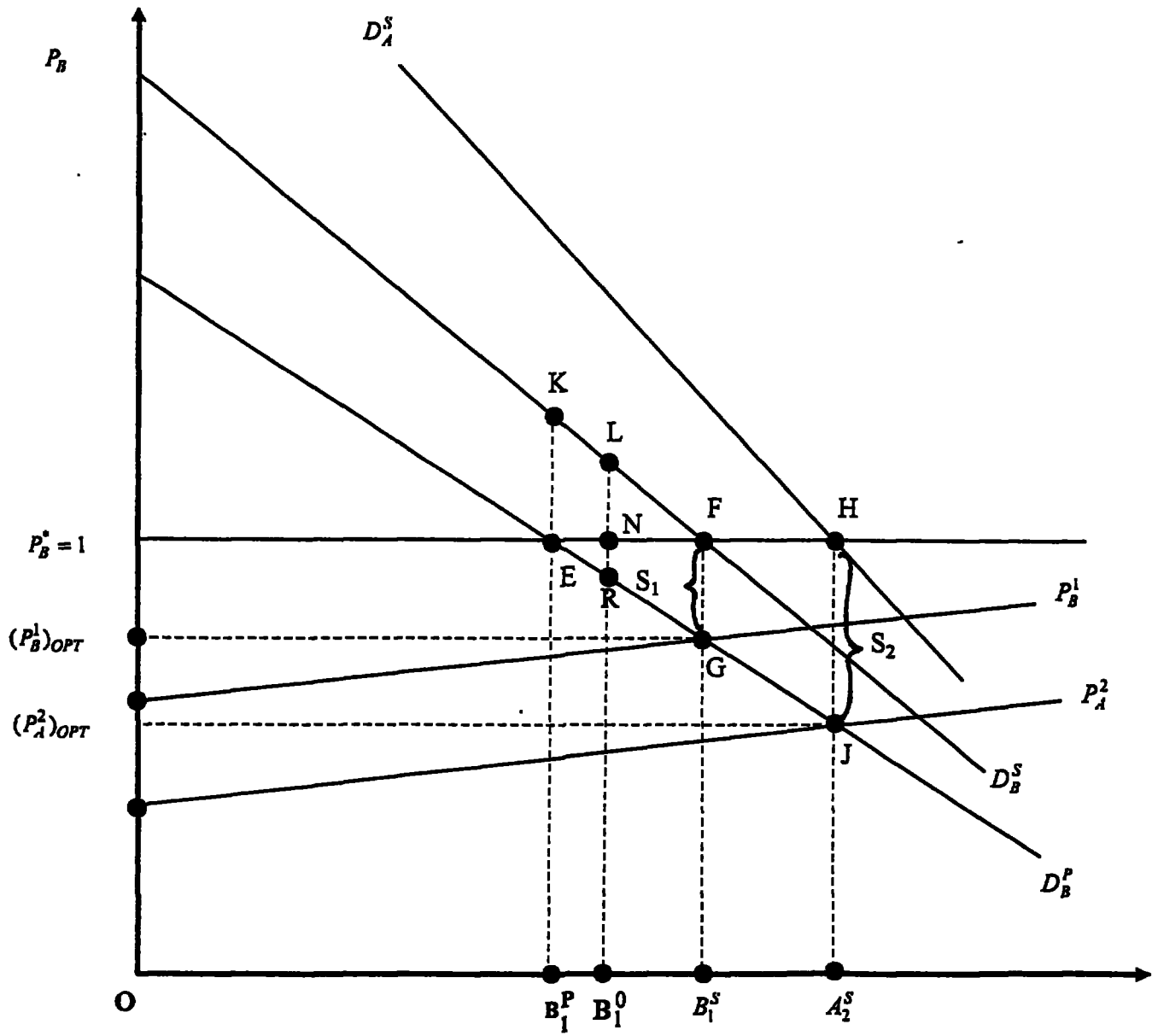
$$(6) S_i = L_i Z_i' . SK_i' / \lambda_i = L_i Z_i' . SK_i' / X_R^i; \quad i = 1, 2,$$

where  $\lambda_i$  is the marginal utility of income. Note that  $\lambda_i = X_R^i / P_R^* = X_R^i$ , the marginal utility of  $R$ . Note also that the optimum subsidy  $S_i$  is equal to the optimum subsidy rate defined as a share of the world price (since  $P_A^* = P_B^* = 1$ ). Note also that  $S_i$  need not increase with  $L_i$  because  $Y_i$  increases with  $L_i$  (equation (2)), and  $SK_i'$  falls with an increase in  $Y_i$  (equation (3)).

Since Countries 1 and 2 continue to trade with the ROW following the import subsidy  $S_i$  (see equation (1)), producer prices in Countries 1 and 2 are not affected by the import subsidy. The only effect is to lower the consumer price of imports from the partner.

This is shown for Country 1 in Figure 1 where all quantities are in per capita terms.  $D_B^P$  ( $D_B^S$ ) measures the private (social) value of good  $B$  for Country 1. The demand price on the

Figure 1.





'social' demand curve  $D_B^S$  (i.e., the social value) is the sum of the private value and the value of the externality  $L_1.Z_1'.SK_1'/X_R^1 = L_1.Z_1'.SK_1'/\lambda_1$ . Following the strict concavity assumptions made in equations (1) and (3), the vertical distance between the two demand curves falls with  $B_1$ . Private equilibrium in the absence of interventions is at point E, where  $X_B^1/X_R^1 = P_B^*/P_R^* = 1$ , and imports equal to  $B_1^P$ . The social optimum is at point F, where  $(X_B^1 + L_1.Z_1'.SK_1')/X_R^1 = P_B^*/P_R^* = 1$ , and imports equal to  $B_1^S$ . This solution is obtained with a subsidy on imports of good B from Country 2 equal to  $S_1 = L_1.Z_1'.SK_1'/X_R^1 = L_1.Z_1'.SK_1'/\lambda_1$ . This is shown in Figure 1 by the line  $P_B^1$ , the consumer price of good B in Country 1 - obtained as the world price  $P_B^*$  minus the import subsidy (or  $P_B^* - S_1 = 1 - S_1$ ) - and which intersects the private demand curve  $D_B^P$  at point G, with subsidy  $S_1 = FG$  and imports  $B_1^S$ .

The relative consumer prices following imposition of the subsidy rate  $S_1$  are:

$$(7) P_A^1/P_R^1 = 1, P_B^1/P_R^1 = 1 - S_1, P_A^2/P_R^2 = 1 - S_2, P_B^2/P_R^2 = 1.$$

As can easily be verified, the same relative price configuration as the one obtained with the subsidy rate  $S_1$  on partner imports can be obtained with a tax rate  $T_1 = S_1/(1 - S_1)$  on imports from the ROW and on consumption of the home good (with the tax returned in lump sum fashion). Thus, welfare of Country  $i$  ( $i = 1, 2$ ) is maximized either with a subsidy rate  $S_i$  on imports from the partner, or alternatively, by Countries 1 and 2 forming a RIA with a tax rate on imports from the ROW of  $T_i = S_i/(1 - S_i)$  and an equal tax rate on consumption of the home good.

Note that even if the tax is imposed exclusively on imports from the ROW and not on consumption of the home good, there is a positive tax smaller than  $T_i$  at which welfare is higher

than in the absence of interventions, though welfare is lower than with the optimum subsidy  $S_i$  or with the optimum tax  $T_i$  applied to both imports from the ROW and to consumption of home goods.

The impact of the optimum intervention on per capita income and welfare can be seen in Figure 1 (measured in currency units). Benefits from security  $Z_1$  increase by area EGFK, income  $X_1$  falls by area EFG, and welfare  $U_1$  rises by area EFK. Note that since the security externality falls as imports increase, area EFK is larger than area EFG. The income loss for Country 1 from the RIA can be approximated by  $S_1^2 \cdot B_1 \cdot \varepsilon_B / 2P_B^1$ , where  $\varepsilon_B$  is the elasticity of demand for good B in Country 1. Thus,  $S_1^2 \cdot B_1 \cdot \varepsilon_B / 2P_B^1$ , the income loss measured as the loss from the RIA relative to a free trade situation, provides a lower bound of the welfare gain EFK generated by the optimum intervention.

#### 4.1. Symmetry

Under symmetry between Countries 1 and 2,  $L_A = L_B = L$ ,  $a = b$ ,  $Y_A = Y_B$ , and  $Z_1 = Z_2 = Z$ . Since  $U$  is symmetric in A and B,  $B_1 = A_2 = M$ ,  $SK_A = SK_B = SK$ , and  $U_A = U_B = X(M, M, R) + Z[SK(M, 1)]$ , with

$$(8) S_1 = S_2 = S = L \cdot Z' \cdot (\partial SK / \partial M) / X_R = L \cdot Z' \cdot (\partial SK / \partial M) / \lambda.$$

Thus, under symmetry, welfare of Countries 1 and 2 is maximized either with a subsidy rate equal to  $S$  on imports from the partner, or with the formation of a customs union (CU) between

Countries 1 and 2 with common external tariff rate  $CET = S/(1-S)$  and with a tax rate  $T = CET$  on consumption of the home good.

Note also that in the symmetric case, trade between the partners is balanced and so is their trade with the ROW. This is not necessarily the case under asymmetry.

#### 4.2. Asymmetry

Assume symmetry between Countries 1 and 2, but with one exception: for any  $SK_1 = SK_2$ ,  $Z_2' > Z_1'$ . In other words, increasing security is more important in Country 2 than in Country 1. This may be due to the fact that Country 1 has a stronger tendency to resort to aggression to resolve disagreements or that Country 2 suffered more in previous wars than Country 1.<sup>12</sup> The equilibrium in the previous subsection would no longer be sustainable because Country 2 now desires a subsidy  $S_2 > S_1$  (see equation (6)). In other words, the optimum subsidy for Country 2 - the country with the stronger security concerns - is larger than that of Country 1.

Alternatively, Countries 1 and 2 can maximize welfare by forming a FTA with a tax rate  $T_1 = S_1/(1 - S_1)$  on imports from the ROW and on consumption of the home good, and with  $T_2 > T_1$ .<sup>13</sup> Thus, optimum tariffs on imports from the ROW are higher for the country with the stronger security concerns. Note that with  $S_2 > S_1$ ,  $B_1 < A_2$ . Thus, at the social optimum, Country 1 runs a trade surplus with Country 2 and a deficit with the ROW (and vice versa for Country 2). In other words, at the social optimum, the country with stronger security concerns imports more from its partner.

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<sup>12</sup> For instance, France may have been more concerned with security than Germany in the first half of the 20th century while the opposite may have been true in Napoleonic times.

<sup>13</sup> The FTA requires rules of origin to prevent deflection of R from Country 1 to Country 2.

This is shown in Figure 1. Country 2's private demand curve  $D_A^P$  is identical to  $D_B^P$ . However, the 'social' demand curve for Country 2 is  $D_A^S > D_B^S$ , and the price function  $P_A^2$  (equal to the world price minus the optimum subsidy function  $S_2$ ) intersects the demand curve at point J. The subsidy  $S_2 = HJ > S_1 = FG$ , and  $B_1 < A_2$ .

Alternatively, assume symmetry between Countries 1 and 2 except for  $Y_1 > Y_2$ . This may be due either because  $a > b$ ,  $L_1 > L_2$  or both (equation (2)). Assume  $a > b$  and  $L_1 = L_2$ . From equation (3),  $\partial^2 SK_1 / \partial B_1 \partial (Y_2/Y_1) > 0$  and  $\partial^2 SK_2 / \partial A_2 \partial (Y_1/Y_2) > 0$ . Thus,  $SK_2' > SK_1'$  for  $A_2 = B_1$  (i.e., for the same level of imports from the partner). In other words, the marginal impact of imports from the partner on home country security is larger for Country 2 than for Country 1. This would imply  $S_2 > S_1$ . On the other hand, the marginal utility of income  $\lambda_1 < \lambda_2$  since  $y_1 > y_2$  (i.e., the demand for security increases with per capita income and is thus larger in Country 1 than in Country 2), implying  $S_2 < S_1$ . Thus, whether  $S_2$  is larger or smaller than  $S_1$  depends on whether the first or second effect is larger.

If  $Y_1 > Y_2$  is due to the fact that  $L_1 > L_2$  (with  $a = b$ ), then the first reason for  $S_2 > S_1$  mentioned in the previous paragraph continues to hold, but the second one does not since  $y_1 = y_2$ . Thus,  $S_2 > S_1$  in this case.

Note that in both the symmetric and asymmetric cases, the welfare of both Countries 1 and 2 would also be maximized if one of them applied the optimum subsidy on imports from the partner while the other applied the optimum tax on imports from the ROW and on consumption of the home good. The formation of a RIA (CU or FTA) would require coordination to ensure that both Countries 1 and 2 applied the tax. If we added to the model the assumption that policy coordination provided additional security benefits by improving trust and understanding among the

leaders (and negotiators) of both countries (see the quote from Bastian 1996 in Section 2), then a RIA (accompanied by appropriate domestic taxes) would be superior to subsidies on imports from the partner, and welfare maximizing governments in Countries 1 and 2 would coordinate their policies. On cooperative solutions, see Section 8 (Extensions).

What has been shown so far is that, in the presence of security externalities, the formation of a RIA provides an optimum (though not the only one). In what follows, we examine the implications of the formation of such an optimum RIA for the evolution of external tariffs over time as well as following deep integration and enlargement.

The issue of whether Countries 1 and 2 are symmetric or asymmetric has no significant impact on results in the remainder of the paper. Unless noted otherwise, symmetry is assumed below.

## **5. Trade Preferences and Deep Integration**

It is often argued that the focus on the static second-best aspects of regional integration may be misplaced and that gains can be expected from deep integration, including harmonization of technical standards and of investment codes, and general facilitation of movement of goods and factors. Deep integration is expected to result in lower real trading costs and welfare gains for member countries.<sup>14</sup> A recent example is EC-92 which resulted in lower barriers on intra-EC trade. The impact of EC-92 has been estimated by Smith and Venables (1988), Baldwin (1989), Smith (1992), and Harrison et al. (1996a).

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<sup>14</sup> However, welfare gains are by no means certain if RIAs are not optimal since lowering internal trading costs may in principle result in immiserization. This cannot occur in our model.

An unresolved question is: Are regional trade preferences necessary for or supportive of deep integration on a regional basis? The relationship between deep integration and trade preferences is examined in the case of exogenous deep integration in Section 5.1 and in the case of endogenous deep integration in Section 5.2.

### 5.1. Exogenous Deep Integration

Assume initially that trade with the ROW involves the same trading costs  $C$  as intra-bloc trade. Following deep integration, the trading cost for intra-bloc trade falls to  $C_0 < C$  while trading costs with the ROW remain unchanged at  $C$ . Since trade with the ROW continues following deep integration (see equation (1)), producer prices in Countries 1 and 2 are not affected by deep integration, but consumer prices in the home country for goods imported from the partner ( $B_1$  in Country 1 and  $A_2$  in Country 2) fall by an amount  $C - C_0$ . Consequently, consumption (= imports) of  $B_1$  and  $A_2$  rises. Given that  $Z''$ ,  $SK' < 0$  (equations (1) and (3)), the optimum subsidy  $S_1$  falls (equation (6)).

A reduction in trading costs means that the  $P_B^*$  line in Figure 1 shifts downwards and the intersection point E (of the  $P_B^*$  line and the private demand curve  $D_B^S$ ) shifts to the right, and similarly for the intersection point F (of the  $P_B^*$  line and the 'social' demand curve  $D_B^S$ ). Since the distance  $FG = S_1$  falls as  $B_1$  increases, the optimum subsidy falls.

Equivalently, lower trading costs on intra-bloc trade imply lower optimum taxes on trade with the ROW and on consumption of home goods. Thus, in the case of exogenous deep integration within the region, trade preferences and deep integration are substitutes: lower intra-bloc

trading costs imply lower optimum trade preferences.

## 5.2. Endogenous Deep Integration

Alternatively, assume that lowering trade barriers on intra-bloc trade is costly and that the cost is negatively related to the level of trust or security capital  $SK$ . Since trust is positively related to imports from the partner, a larger volume of such imports reduces the cost of deep integration and is thus likely to result in more deep integration and in lower unit trading costs on trade with the partner.

Haas (1958), saw increased trade among members of the EC-6 as having a positive impact both in the area of international politics and of deep integration. He wrote (p. 311) that "... it is inconceivable that the liberalization not only of trade but of the conditions governing trade can go on for long without "harmonization of general economic policies" spilling over into the fields of currency and credit ...The spill-over may make a political community of Europe ..."

We examine two alternative cases. In the first one, deep integration takes place every period. In the second one, deep integration takes place once and for all. Assume unit trading costs  $C$  on imports from the partner are

$$(9) C = C[SK(M)], \quad \partial C / \partial M = (\partial C / \partial SK) \cdot SK' < 0,$$

where  $M$  is the volume of imports from the partner (and  $M = B_1 = A_2$  under symmetry).

In this case, there are two sources of positive externalities - rather than one - associated with imports from the partner. Individual  $I_1$  who imports from the partner generates an externality in

terms of additional security. And additional security raises utility directly (equation (1)) as well as indirectly by lowering the unit cost of intra-bloc trade. The total trading cost TC on imports M from the partner and the marginal social cost of trading MSC are

$$(10) \text{ TC} = M.C[\text{SK}(M)], \text{ MSC} = C.(1 + \varepsilon), \varepsilon \equiv (\partial C / \partial M).(M/C) < 0.$$

Individual  $I_i$  takes the private cost C of importing from the partner into account but not his negative effect on unit costs  $\varepsilon.C$ . The optimum subsidy  $S_E$  is

$$(11) S_E = Z'.(\partial \text{SK} / \partial M) / \lambda - \varepsilon.C > S,$$

with S defined in equation (8).

Equivalently, the optimum is obtained with a common external tariff  $\text{CET}_E = S_E / (1 - S_E) > \text{CET} = S / (1 - S)$  and a tax on home consumption  $T_E = \text{CET}_E > T = \text{CET}$ .

Alternatively, assume that if deep integration takes place, it does so at a given point in time (e.g., in 1992 for EC-92) and is permanent. For instance, assume that trust and security  $\text{SK}_i$  do not depend on the flow of current intra-bloc trade but on past flows as well (see Section 6 on that) and that deep integration will take place when  $\text{SK}_i$  is sufficiently large and the cost of deep integration is sufficiently low. Then, since increased intra-bloc trade generates externalities in terms of lowering the cost of future deep integration, the optimum subsidy on intra-bloc trade (or optimum CET) is higher before deep integration. However, once deep integration has taken place and intra-bloc trading costs have fallen, the optimum subsidy (or optimum CET) is lower.



Thus, if the cost of deep integration is unrelated to the degree of trust between Countries 1 and 2, not only are trade preferences not required in order to implement deep integration measures but deep integration actually implies a reduction in optimum trade preferences. On the other hand, if deep integration vanishes every period and its cost declines with the degree of security and trust, optimum trade preferences are larger. And if deep integration takes place once and for all and is permanent, optimum trade preferences are higher before deep integration takes place and lower thereafter.<sup>15</sup>

## 6. Dynamics

The EC has reduced its external trade barriers on manufacturing products with respect to the ROW over time. Average tariffs on manufacturing products have fallen from about 13% in 1958 to about 3% after the Uruguay Round.<sup>16</sup> Similarly, developing countries forming RIAs in the 1960s imposed high external trade barriers while recent RIAs and new incarnations of old RIAs have tended to impose lower external trade barriers. Is this gradual reduction of external trade barriers over time predicted by our model of regional integration?

So far, security capital  $SK$  has been assumed to depend on the current flow of imports from the partner. In other words,  $SK$  has been assumed to depreciate fully at the end of each period. In

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<sup>15</sup> Of course, there are different degrees of deep integration, and though the 'first' degree (say, EC-92) occurs once and for all, it may be followed by a 'second' degree of deep integration (say, monetary union). The implications for the evolution of external trade barriers is ambiguous in this case. It depends on the 'production functions' of the later degrees of deep integration. If, as seems plausible, the marginal product of the sum of the early degrees of deep integration in the production of later degrees of deep integration rises with the degree of deep integration, and the marginal product of intra-bloc trade falls with the degree of deep integration, then optimum external trade barriers fall as the degree of deep integration increases.

<sup>16</sup> Note that the reduction in the EC's external trade barriers over time has taken place despite the increase in the number of member countries from six to fifteen, i.e., despite the increase in the optimum CET level based on market power considerations.

fact, though, SK (trust and goodwill) depends not only on current behavior but on past behavior as well. In other words, it does not depreciate entirely at the end of every period. Assume that the level of  $SK_t$  at time  $t$  depends on the current flow of imports from the partner and on  $SK_{t-1}$  at  $t-1$ , with a rate of depreciation of SK equal to  $\delta < 1$ . Expressing variables in continuous time, equation (3) becomes, under symmetry, the law of motion (3'):

$$(3') \dot{SK} = F(M) - \delta.SK; \delta < 1,$$

where  $\dot{SK} \equiv \partial SK / \partial t$  is the time derivative of SK,  $F(M)$  is the current gross addition to the stock of security capital (with  $F' > 0$ ), and the subscript 't' on SK and M has been deleted to simplify notation. Since  $Y_2/Y_1 = Y_1/Y_2 = 1$  under symmetry, the terms have been omitted from equation (3').

Start at  $SK = 0$ . As SK increases, its marginal utility  $Z'$  falls (equation (1)). If governments are myopic and choose  $S$  to maximize current welfare  $W = L.U$  in each period, then from equation (6),  $S$  falls over time. However, optimizing governments will also take into account the impact of current subsidies on the level of SK and thus on future welfare.

Assume the governments of Countries 1 and 2 select an optimum time path for the subsidy  $S$  on imports from the partner in order to maximize  $V$ , the present value of  $W = L.U$ .

The Hamiltonian is

$$(12) H = W(SK, S, t) + q \cdot \dot{SK}(SK, S, t),$$

where  $q$  is the marginal value of  $SK$ ,  $\partial V_{MAX}/\partial SK$ , where  $V_{MAX}$  is the maximum value of  $V$  obtained with the optimum path for  $S$ . The solution (or maximum principle) is

$$(13a) \partial H/\partial q = \dot{SK} = F(M) - \delta \cdot SK \quad (\text{equation (3')}),$$

$$(13b) \partial H/\partial S = \partial W/\partial S + q \cdot (\partial \dot{SK}/\partial S) = 0, \quad \text{and}$$

$$(13c) \partial H/\partial SK = \partial W/\partial SK + q \cdot (\partial \dot{SK}/\partial SK) = -\dot{q}.$$

From equation (13a),  $\partial \dot{SK}/\partial S = (\partial \dot{SK}/\partial M) \cdot (\partial M/\partial S) > 0$ . Thus, from equation (13b),  $\partial W/\partial S < 0$ . Why is  $\partial W/\partial S < 0$ ? If a government myopically maximized current welfare without regard for future welfare, it would choose a subsidy level  $S_W$  so that  $\partial W/\partial S_W = 0$ . However, an increase in the subsidy also generates future welfare gains because it raises  $M$  and thus raises  $SK$ . Thus, the subsidy  $S_V$  which maximizes  $V$  is larger than the myopic  $S_W$  which maximizes  $W$ . Consequently,  $\partial W/\partial S < 0$  at the optimum.

Assume  $SK$  is low (say following a series of wars, e.g., in the 1950s for France and Germany) so that  $SK$  rises with imports  $M > 0$  between the two partners (equation (13a)) and the value of  $SK$  falls, i.e.,  $\dot{q} < 0$ . From equation (13b), a reduction in  $q$  over time implies that  $\partial W/\partial S$  falls over time in absolute value or becomes less negative since  $\partial \dot{SK}/\partial S$  falls with  $SK$  as well in absolute value.<sup>17</sup> In other words, along its optimum path,  $S_V$  falls over time and approaches  $S_W$ .

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<sup>17</sup>  $\partial \dot{SK}/\partial S = (\partial \dot{SK}/\partial SK) \cdot (\partial SK/\partial M) \cdot (\partial M/\partial S) = -\delta \cdot (\partial SK/\partial M) \cdot (\partial M/\partial S)$ . The depreciation rate  $\delta$  is constant,  $\partial M/\partial S$  is independent of  $SK$  since  $U$  is additive, and  $\partial SK/\partial M = SK'$  falls with  $M$ , so that  $\partial \dot{SK}/\partial S$  falls with  $SK$  in absolute value.

Note that  $S_W$  also falls as  $SK$  rises because the marginal impact of  $SK$  on  $W$  falls with  $SK$  ( $Z'' < 0$ ). Equivalently, the optimum common external tariff CET (recall we are assuming symmetry) falls over time. Note that the decline in the CET will stop once a steady state is attained, i.e., once  $\dot{SK} = 0$  (equation (3')).

On the other hand, there may be times of crisis or reversal where  $SK$  suddenly falls. Then, the optimum CET would suddenly increase before gradually starting to fall again. If the crisis is temporary, with no impact on behavior, CET eventually returns to its previous steady-state value. On the other hand, a deep crisis may affect security preferences or the  $Z$ -function in equation (1) as well as the security production function in equation (3), with a permanent change in optimum external barriers.

## **7. Enlargement and Domino Effects**

### **7.1. Symmetry**

We now examine the impact of bloc enlargement on welfare and on the optimum CET. Assume a fourth country (Country 3) which produces good  $C$ , exports it to Countries 1, 2 and ROW, and imports goods  $A$ ,  $B$  and  $R$ . Country 3 is symmetric with Countries 1 and 2. Each one of Countries 1, 2 and 3 enjoys the same degree of trust (or suffers the same degree of mistrust) with respect to the other two.

Utility for individual  $I_i$  in Country  $i$  is now

$$(1') U_i = X(A_i, B_i, C_i, R_i) + Z_i(SK_i); \quad i = 1, 2,$$

$$X_j, Z_i' > 0, \quad X_{jj}, Z_i'' < 0, \quad X_j(j=0) = \infty, \quad X_j = \partial X / \partial j \quad (j = A_i, B_i, C_i, R_i).$$

The level of security in the home country is positively related to imports from both partner countries (and positively related to its relative income with respect to both), i.e.,

$$(3'') SK_1 = SK(B_1, C_1); SK_2 = SK(A_2, C_2); SK_3 = SK(A_3, B_3),$$

with  $SK$  symmetric in both imports (and with the relative income terms not included in the equation for simplicity).

Assume the three countries (Countries 1, 2 and 3) impose optimum subsidies on trade with each other. Under symmetry, each country imposes the same subsidy rate  $S$  as the other two and imposes the same subsidy on its imports from both partners. The same result is obtained with a common external tariff rate  $CET = S/(1-S)$  and a tax rate  $T = CET$  on the consumption of the home good.

First, we note that each member country's welfare rises when the RIA expands from two to three countries. In the two-country RIA case, the optimum subsidy is applied on the imports of one country only while security benefits are obtained through imports from two countries. This case is equivalent to a constrained optimization where one of the two subsidies is set equal to zero. The optimum in this case results in a level of welfare which is necessarily lower than under unconstrained optimization in the case of the three-country RIA, since in the latter case all externalities associated with the impact of imports on security are internalized. Consequently, starting from a two-member country RIA (say, Countries 1 and 2), there is both a demand (by Country 3) and a supply (by the RIA members) for enlargement. In this sense, there is a domino

effect: if a two-country RIA does exist, the third country will join. However, if no two-country RIA exists, the three countries have an incentive to form a RIA simultaneously.<sup>18</sup>

We now turn to the impact of enlargement on the optimum CET. Define the optimum subsidy  $S$  and optimum CET for a bloc with  $k$  members ( $k = 2, 3$ ) by  $S^k$  and  $CET^k$ , respectively. What is the relationship between  $S^2$  and  $S^3$  (or  $CET^2$  and  $CET^3$ )? We show in the Appendix that  $S^k$  need not increase with enlargement, though  $S^2 < S^3$  is likely to hold on average. This result generalizes to  $S^{m-1} < S^m$  for a bloc expansion from  $m - 1$  to  $m$  member countries in a world of  $m$  symmetric countries ( $m \geq 3$ ), but not to  $S^{k-1} < S^k$  for a customs union of size  $k$  ( $k < m$ ) in a world of  $m$  symmetric countries.

In a world of symmetric blocs with the optimum CET determined by market power, the CET increases with enlargement. In our model, the optimum CET need not increase with enlargement, though it is likely to do so on average.

## 7.2. Asymmetry

We now examine enlargement under a specific case of asymmetry. Even though the main security concern in the 1950s in Western Europe was with France and Germany, four countries (Belgium, Netherlands, Luxembourg and Italy) joined France and Germany to form the EC-6. These four countries were smaller economically and weaker militarily. Similarly, Argentina and Brazil decided in the 1980s to integrate their economies, and Uruguay and Paraguay - two small

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<sup>18</sup> On domino effects, see Baldwin (1995).

neighbors - decided to join them and form Mercosur. And Chile and Bolivia recently signed FTAs with Mercosur.<sup>19</sup>

Can the present model say anything about domino effects in such asymmetric situations? Imagine that Countries 1 and 2 are symmetric and are large compared to Country 3 (though they are still small economically compared to the ROW). Assume that, given the small size of Country 3, security in Countries 1 and 2 depends on the level of trade between them and not on the level of trade with Country 3. Countries 1 and 2 have an incentive to form a RIA. The latter reduces the level of security in Country 3 because Countries 1 and 2 import less from it. Thus, Country 3 has a stronger incentive to join in a three-country RIA than it did to join with either Country 1 or 2 before the latter formed a two-country RIA. On the other hand, Countries 1 and 2 have no incentive to allow Country 3 to join the RIA and Country 3 may have to offer some compensation to Countries 1 and 2 in order to be allowed to join. If the gains to Country 3 from joining are larger than the losses (if any) to Countries 1 and 2 (say, because they now trade more with Country 3 and less among themselves), Country 3 will compensate them and join the RIA.<sup>20</sup> For a North-South model where the developing country makes a side payment to the developed country in order to generate a RIA, see Ethier (1996).

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<sup>19</sup> On a comparison of the impact for Chile of a FTA with Mercosur versus a FTA with NAFTA which does not include security externalities, see Harrison, Rutherford and Tarr (1996b), Schiff and Sapelli (1996) and Schiff and Ingco (1996).

<sup>20</sup> In some cases, the gains for Country 3 may be very large. For instance, Paraguay suffered a devastating defeat in the 1860s in its war (known in Spanish as "Guerra de la Triple Alianza") with a coalition made up of Brazil, Argentina and Uruguay, and where most of its male population over 15 years of age perished. Such a collective memory may provide a strong incentive to avoid future potential conflicts.

## **8. Conclusion**

**This paper has examined a world in which regional trade agreements offer scope to reduce security tensions between neighbors. Assuming that security with a neighbor increases as imports from that neighbor increase, and making no assumptions about the relative sizes of trade diversion and trade creation, we have shown that:**

**1) The formation of a customs union (CU) - accompanied by appropriate domestic taxes - provides an optimum economic arrangement under symmetry, and the same holds for a free trade agreement (FTA) under asymmetry;**

**2) Deep integration (such as EC-92) implies lower optimum external tariffs if it is exogenous, higher optimum external tariffs if it is endogenous and vanishes annually, and higher optimum external tariffs before deep integration and lower ones thereafter if deep integration is endogenous, takes place once and for all and is permanent;**

**3) If the level of security depends on current as well as past trade flows and is in steady state in the absence of trade barriers, the optimum external tariffs decline over time; and**

**4) Enlargement of bloc size (in terms of the number of symmetric countries) implies higher welfare, with an ambiguous impact on the optimum CET though it is likely to be higher; and some form of domino effect exists.**

**Though externalities associated with security matters imply that a RIA may maximize welfare, the model suggests that the RIA is a transitory arrangement in the sense that optimum trade preferences are highest at the time the RIA is formed (when security is low) and tend to decline over time. In other words, the RIA's external trade policy becomes increasingly open over time.**



## 9. Extensions

First, our model abstracts from defense expenditures as an alternative way to generate security. This was done for the sake of simplicity and to avoid game-theoretic issues at this stage. We recognize the importance of such issues, which are on our research agenda. In the case of defense expenditures, the cooperative solution is clearly optimal as the alternative may be a prisoner's dilemma situation with large defense expenditures (and not necessarily a higher level of security). In that case, the "peace dividend" following formation of a RIA may be substantial (see Srinivasan 1994, p. 7, for a discussion of these issues in the case of India and Pakistan).

Second, the model assumes that imports from - rather than trade with - the partner country generates security benefits in the home country. Alternatively, one could assume that total trade (imports plus exports) with the partner generates security benefits. In that case, RIAs are likely to be superior to optimum intra-bloc trade subsidies. There are both game-theoretic and practical reasons for this. First, each country will use a subsidy to maximize national welfare. However, individual decisions in the home country generate externalities not only for other individuals of the home country but also for those of the partner country because home country's imports are the partner's exports. Thus, intra-bloc trade subsidies which maximize national welfare generate a Nash equilibrium, with welfare and Nash subsidies lower than in a cooperative equilibrium which could be obtained by forming a RIA. Second, the Nash equilibrium implies subsidies on both imports and exports. Export subsidies are GATT-illegal so that even the inferior Nash solution cannot be implemented. The superior cooperative solution implicit in the formation of a RIA (with appropriate domestic taxes) gets around this problem.

## Appendix

We examine here the impact of enlargement on the optimum subsidy or CET. Equation (1') in Section 7.1 can be rewritten as

$$(14) U = X(A, B, C, D) + Z[SK(B, C)],$$

where the subscript 'i' has been deleted for simplicity. Without loss of generality, we examine the issue from the viewpoint of Country 1. Define  $S^k$  as the optimum subsidy in a bloc of  $k$  countries ( $k = 2, 3$ ). From equation (14), we have

$$(15) \frac{dU}{dS} = [(\frac{\partial X}{\partial A}).(\frac{dA}{dS}) + (\frac{\partial X}{\partial B}).(\frac{dB}{dS}) + (\frac{\partial X}{\partial C}).(\frac{dC}{dS}) + (\frac{\partial X}{\partial R}).(\frac{dR}{dS})] + \\ Z'[(\frac{\partial SK}{\partial B}).(\frac{dB}{dS}) + (\frac{\partial SK}{\partial C}).(\frac{dC}{dS})].$$

Note that since income measured at world prices,  $Y_1 = A = aL_1$  does not change with the subsidy, and since all world prices are unity, balanced trade implies  $dA + dB + dC + dR = 0$ . Assume we start with  $S = S^3$  and apply it to imports of both B and C. Since  $S^3$  is an optimum,  $dU/dS = 0$ . Given symmetry,  $B = C > A = R$ ,  $\frac{\partial X}{\partial A} = \frac{\partial X}{\partial R} > \frac{\partial X}{\partial B} = \frac{\partial X}{\partial C}$ ,  $\frac{dB}{dS} = \frac{dC}{dS} = -\frac{dA}{dS} = -\frac{dR}{dS} > 0$ , and  $\frac{\partial SK}{\partial B} = \frac{\partial SK}{\partial C}$ . Substituting these in equation (15), we have

$$(16) \frac{dU}{dS} = 2(\frac{dB}{dS}). [(\frac{\partial X}{\partial B} - \frac{\partial X}{\partial A}) + Z'.(\frac{\partial SK}{\partial B})] = 0.$$

Alternatively, assume that  $S = S^3$  applies only to imports of B and the subsidy on imports of C is set equal to zero. Such a configuration of subsidies is not an optimum, so  $dU/dS \neq 0$ . In this case,  $A = C = R < B$ ,  $dA/dS = dC/dS = dR/dS < 0$ ,  $dB/dS = -dA/dS - dC/dS - dR/dS = -3(dA/dS)$ , and  $\partial X/\partial A = \partial X/\partial C = \partial X/\partial R$ . Substituting in equation (15), we have

$$(17) \quad dU/dS = (dB/dS) \cdot [(\partial X/\partial B - \partial X/\partial A) + Z' \cdot (\partial SK/\partial B)] - (Z'/3) \cdot (\partial SK/\partial C).$$

The objective is to evaluate  $dU/dS$  in equation (17). If the sign were negative (positive), then  $S$  would have to be reduced (increased) to reach the optimum subsidy  $S^2$  in the two-country RIA case, i.e., then  $S^2 < S^3$  ( $S^2 > S^3$ ).

Note the similarities between equations (16) and (17). The term  $\Gamma(A, B, C, R) = [(\partial X/\partial B - \partial X/\partial A) + Z' \cdot (\partial SK/\partial B)] = 0$  in equation (16). If both equations were evaluated at the same values for  $A, B, C$  and  $R$ , then  $dU/dS$  in equation (17) would be  $dU/dS = \Gamma(A, B, C, R) - (Z'/3) \cdot (\partial SK/\partial C) = - (Z'/3) \cdot (\partial SK/\partial C) < 0$ , and thus  $S^2 < S^3$ . However, equations (16) and (17) are not evaluated at the same values for  $A, B, C$  and  $R$ , so that  $\Gamma(A, B, C, R)$  is not necessarily equal to zero in equation (17).

We now show that the value of  $\Gamma(A, B, C, R) = (\partial X/\partial B - \partial X/\partial A) + Z' \cdot (\partial SK/\partial B)$  can be either positive or negative when evaluated at the quantities prevailing in equation (17). The difference between equations (16) and (17) is that the subsidy at the rate  $S^3$  in equation (16) is set equal to zero on good C in equation (17). Thus,  $B$  and  $A$  are both larger in equation (17),  $\partial X/\partial B$  and  $\partial X/\partial A$  are both smaller, and the impact on  $(\partial X/\partial B - \partial X/\partial A)$  is ambiguous. The impact on  $Z' \cdot (\partial SK/\partial B)$  is ambiguous as well. At the larger value of  $B$  in equation (17),  $\partial SK/\partial B$  is likely to be

smaller, but since SK is also likely to be smaller,  $Z'$  is larger, and the impact on  $Z' \cdot (\partial SK / \partial B)$  is ambiguous.<sup>21</sup> In other words, the sign of  $\Gamma(A, B, C, R)$  in equation (17) is ambiguous. For some functional forms of  $X, Z$  and  $SK$ ,  $\Gamma(A, B, C, R)$  will be negative, while for others, it will be positive or zero.

One would need to know the exact functional forms of  $X, Z$  and  $SK$  in order to be able to determine the sign of  $\Gamma(A, B, C, R)$  in equation (17). However, under symmetry of the positive and negative values for  $\Gamma(A, B, C, R)$  across all functional forms for  $X, Z$  and  $SK$ , one may expect its average value to be zero.<sup>22</sup> And since  $-(Z'/3) \cdot (\partial SK / \partial C) < 0$ , one may expect the average value of  $dU/dS$  to be negative. This implies that on average,  $S^2 < S^3$ .

It is easy to show that the result generalizes to  $S^{m-1} < S^m$  for a bloc expansion from  $m - 1$  to  $m$  member countries in a world of  $m$  symmetric countries ( $m \geq 3$ ), but not, unfortunately, to  $S^{k-1} < S^k$  for a customs union of size  $k$  ( $k < m$ ) in a world of  $m$  symmetric countries.

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<sup>21</sup>Comparing equilibria in equations (16) and (17), a second-degree Taylor expansion of the difference in SK is:  $\Delta SK = [\Delta B \cdot (\partial SK / \partial B) + \Delta C \cdot (\partial SK / \partial C)] + [\Delta B^2 \cdot (\partial^2 SK / \partial B^2) + \Delta C^2 \cdot (\partial^2 SK / \partial C^2)]/2 + [\Delta B \cdot \Delta C \cdot (\partial^2 SK / \partial B \partial C)]$ . What is the sign of  $\Delta SK$ ? The first term in square brackets is negative. To show this, note that  $B = C$  in equation (16) so that  $\partial SK / \partial B = \partial SK / \partial C$ , but  $\Delta B < -\Delta C$  (the increase in  $B$  is smaller than the decline in  $C$  because removal of the subsidy on  $C$  also leads to a rise in consumption of  $A$  and  $R$ , and from the budget constraint,  $-\Delta C = \Delta A + \Delta B + \Delta R > \Delta B$ ). The second term in square brackets is negative since the second derivatives are negative. (Intuitively, as  $C$  falls,  $\partial SK / \partial C$  rises so that the loss in SK from additional reductions in  $C$  increases; similarly, the gains in SK from increases in  $B$  decline with  $B$ ). On the other hand,  $\partial^2 SK / \partial B \partial C$  may be negative (if Country 1 is less concerned about security with respect to Country 2 (3) if security with respect to Country 3 (2) is higher), and the third term in square brackets would then be positive. Thus, though it may seem likely that removing the subsidy on imports of good  $C$  results in  $\Delta SK < 0$ , this need not be the case. However, no matter what the sign of  $\Delta SK$ , the fact remains that the difference in  $Z' \cdot (\partial SK / \partial B)$  is ambiguous. The reason is that with an ambiguous change in SK, the changes in both  $Z'$  and in  $\partial SK / \partial B$  are ambiguous.

<sup>22</sup>Strictly speaking, whether the average value of  $\Gamma(A, B, C, D)$  in equation (17) is zero or not depends on the definition of the domain of the functions  $X, Z$  and  $SK$ .

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